E 2
4/22/99

ENFORCEMENT CONFIDENTIAL
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

April 22, 1999

MEMORANDUM

Subject: Site Strategy
Old American Zinc Plant Site
Fairmont City, St. Clair County, Illinois
CERCLIS ID: ILD0000034355

From: Site Assessment Team (SAT):

Jeanne Griffin, Team Facilitator
Ron Murawski, Remedial Project Manager
Pete Sorensen, State Project Manager
Allison Gassner, Assistant Regional Counsel
Gordie Blum, Community Involvement Coordinator
Pat Van Leeuwen, Toxicologist
Jim Chapman, Ecologist
Carl Cuffman, Enforcement Support

To: Regional Decision Team

The purpose of this memorandum is to present a strategy to the Regional Decision Team (RDT) for the Old American Zinc Plant Site located in Fairmont City, St. Clair County, Illinois.

SITE DESCRIPTION

The Old American Zinc Plant Site is a 132-acre inactive industrial facility located along Kingshighway just north of East St. Louis. The Site is bordered by Delmar Street to the north, Kingshighway to the east, 45th Street to the west and the Penn Central and Baltimore/Ohio railroad tracks to the south. The area north of the Site is comprised of vacant lots and residences. Land use east of the Site is residential in the northeastern portion and industrial in the southeastern portion. Conrail, which loads and unloads semitrailers onto trains, and Aztec, a former fertilizer plant, lie south of the Site. Residential areas in Washington Park are located south of Conrail and Aztec, across the railroad tracks. A residential area borders the west Site boundary. See Figure 1 for a Site map.

The facility was constructed in the early 1900s and operated until 1967 as a primary zinc smelter. In 1967, the company moved to Sauget, Illinois. At this time, all structures were either moved, or torn down and disposed of off-site. The Site remained vacant until 1979 when XTRA Intermodal purchased the property. The Site was purchased as an area to store semi-trailers. The Site is vacant with the exception of a single building used as the offices of XTRA Intermodal. A number of semi-trailers are also stored on-site by XTRA Intermodal.

The Site is almost entirely covered with slag from the zinc smelters. Two large piles of slag exist in the northern section of the Site. The surface water pathway and soil exposure pathways are of great concern and could cause further problems both on and off-site.

In November, 1994, USEPA tasked the Illinois Environmental Protection Agency (Illinois EPA) to conduct a CERCLA Integrated Site Assessment (ISA) at the Old American Zinc Plant Site. Groundwater migration was not thought to be a concern because most wells are located more than three miles from the contamination, and are upgradient. The surface water flows through small drainageways into a large wetland area. No contaminant airborne release was observed during the ISA, although residents have complained of particulates blowing off-site. Numerous soil samples were taken from surrounding areas and analyzed. Many of these samples indicated arsenic, cadmium, lead, and zinc at elevated levels.

On November 29 and 30, 1994, Illinois EPA took 5 waste samples on-site, and 17 soil and 9 sediment samples off-site. The on-site samples indicated methylene-chloride, semi-volatile, inorganic, and pesticide contamination. The off-site soil samples indicated increased levels of inorganic compounds at residences close to the Site. Sediment samples from Rose Creek, Schoenberger Creek, and the wetlands indicated mostly inorganic contamination.

MIGRATION PATHWAYS

Groundwater Pathway

Local Geology:

According to Illinois State Geological Survey information, the geology of the Fairmont City area generally consists of unconsolidated alluvium and glacial outwash overlying Mississippian and other bedrock layers. These bedrock layers are underlain by basement granitic crystalline rock.

The unconsolidated alluvium and glacial outwash are about 120 feet thick in the Old American Zinc Plant Site area. The upper 15 to 30 feet of this is composed of the Cahokia Alluvium, which is made up predominantly of silt, clay, and fine sand deposits. The rest of the unconsolidated fill is composed of the Mackinaw Member of the Henry Formation which is made up of sand and gravel from glacial outwash.

Beneath the unconsolidated alluvium and glacial outwash lie layers of relatively soft sedimentary rock. Typically, these rocks consist of shale, limestone, and sandstone. Immediately beneath the glacial outwash lies the Mississippian System containing numerous limestone, shale, siltstone, dolomite, and sandstone layers. Beneath this lies the Devonian System, with limestone, sandstone, and shale formations. Beneath the Devonian lies the Silurian System which consists of numerous limestone layers. Underlying the Silurian are the Ordovician and then Cambrian systems which consist of sandstone, dolomite, limestone, and shale. Underlying the Cambrian is the basement granitic crystalline rock.

Local Groundwater Use:

Most of Fairmont City and most of the other cities in the vicinity of the Old American Zinc

Plant Site property use surface water from the Mississippi River for their municipal water supply. However, there is one group of municipal drinking water wells located within the four mile target distance from the Site. They are a group of five wells that are located about three and a half miles to the east of the Site and serve the city of Collinsville. Collinsville has a population of approximately 25,000 people. These five wells range in depth from 98 to 108 feet and all obtain water from the shallow glacial deposits. Despite the fact that the wells are located in a geologic layer with no impermeable geologic layers above it, the five Collinsville wells are not thought to be in danger of becoming contaminated by the Site. The main reason for this is that the wells are located over three miles from the Site and are located upgradient of the Site. Because of this, no wells were sampled during the CERCLA sampling event.

At least one private well of a nearby resident is known to exist. This well was sampled by the Illinois Department of Public Health in 1996. The sampling results indicated contaminant levels below State maximum contaminant levels (MCL) and action levels.

Surface Water Pathway

Surface water drainage from the Old American Zinc Plant Site property flows in a southerly direction and enters Rose Creek (known by locals as "acid ditch"), which borders the southern edge of the property. From here, Rose Creek flows west for a little over a mile where it then flows into a large wetland area. It is believed that the water once flowed into Schoenberger Creek, but due to the construction of a levee along Schoenberger Creek, the water can no longer flow into it. The surface water now flows slowly through these wetlands for about a mile in a northeasterly direction until it meets the Old Cahokia Creek. Old Cahokia Creek meanders in a northwesterly direction and flows into the Cahokia Canal. The Cahokia Canal flows westward until it enters the Mississippi River, which travels south for the remainder of the CERCLA 15-mile surface water target distance.

Several targets exist along the 15-mile surface water target distance route. There are approximately eight miles of wetland frontage along the 15-mile surface water route from the Site, mostly along the Mississippi River. This does not include the large wetland area which was previously mentioned. In addition, the Cahokia Canal, Schoenberger Creek, and Mississippi River are used as fisheries and for other recreational purposes.

No surface water samples were collected during the November, 1994 CERCLA sampling event. However, seven sediment samples (X202, X203, X204, X205, X206, X207 and X208) were collected downstream of the Site in Rose Creek, the wetlands area, and Schoenberger Creek to determine if contaminants from the Old American Zinc Plant Site property have migrated into the surface water pathway. These samples detected levels of inorganic contaminants significantly above background levels. These contaminants included arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc. Based on Site sampling and sampling in sediment adjacent to the Site, it appears that the majority of these contaminants can be at least partially attributed as coming from the Site. Figure 2 shows where the sediment samples were collected.

The concentrations of contaminants found in the sediment samples along the surface water pathway were compared to the 1994 "Guidelines for the Protection and Management of

Aquatic Sediment Quality in Ontario." These sediment quality guidelines are nonregulatory ecological benchmark values that serve as indicators of potential aquatic impacts. The lowest effect levels (LEL) indicate concentrations that can be tolerated by most benthic organisms. All samples except for the mercury background sample were found to contain levels of contaminants well above LELs. Table 1 compares the concentrations of contaminants found in the samples to the LELs. As shown, X202, X203 and X204 were collected in Rose Creek; X205, X206 and X207 were collected in the large wetlands area, and X208 was collected in Schoenberger Creek. Results of a background sample (X209) and an upgradient sample (X201) are also shown.

Table 1: Sediment Contaminant Levels (in ppm)

		Back grnd	Up Grdnt	Rose Creek			Wetlands			Schoenberger Creek
CONTAMINANT	**LEL**	**X209**	**X201**	**X202**	**X203**	**X204**	**X205**	**X206**	**X207**	**X208**
arsenic	6	13.6	44.4	39	-	-	-	-	87	-
cadmium	0.6	8.7	4.0	138	121	82	109	252	102	23
copper	16	44.8	211	1800	208	-	-	217	418	212
lead	31	76.7	1300	3590	580	-	-	642	3170	309
mercury	0.2	0.1	10	4.8	2.6	-	-	2.8	23.4	3.2
zinc	120	955	479	25700	6840	2380	3140	9960	5130	2440

<u>Air Pathway</u>

In 1989, a complaint was filed to the Illinois EPA by a neighbor of the Old American Zinc Plant Site property concerning the blowing of particulate matter from the Site onto his property. In addition, when Illinois EPA discussed this matter with other neighbors, the neighbors confirmed that on dry, windy, summer days, black particulate matter blows off the Site onto their properties. The neighbors claim that on some days the sky is blackened by the release of particulate matter from the Site.

The waste located on-site (slag piles and slag spread throughout the property) has no containment to prevent it from blowing off-site. The large slag piles on the northern portion of the property may not be the main problem because they are well solidified and would not release particulate matter in the wind very readily. However, the slag material that has been spread throughout the Site may be susceptible to being blown off-site since it is in a loose form, and the Site is not vegetated with trees or grasses.

No air samples were collected during the CERCLA sampling event. According to the Illinois Department of Conservation, there are no terrestrially sensitive environments located within one mile of the Site. Two elementary schools exist close to the Site. The Holy Rosary Parish School is about one-quarter mile west of the Site, and the Manners School is about one-half mile south of the Site. An estimated 47 people live within 200 feet, with approximately 45,936 people residing within a four-mile radius of the Site. The approximate population living within a four-mile radius of the Site is:

Distance (miles)	Estimated Population
on-site	0
0 to 1/4	552
>1/4 to ½	828
>½ to 1	1,656
>1 to 2	7,900
>2 to 3	15,000
>3 to 4	20,000

Soil Exposure

As can be seen in Figure 1, the Old American Zinc Plant Site property is surrounded by residential neighborhoods. Several of the residences are located within 200 feet of the Site. In addition to residences, the two schools previously mentioned are also located in the vicinity of the Site. Based on numbers collected from the 1990 Bureau of the Census and topographic maps, it is estimated that 3,036 people live within one mile of the Site.

Fourteen soil samples were collected from residential yards and two were collected from the nearby schools during the November, 1994 CERCLA sampling event. A seventeenth sample was taken as background from a schoolyard in the town of Caseyville, about four miles southeast of the Site. See Figures 3 and 4 for the locations of the samples. The samples were analyzed only for inorganic constituents because that is what is most suspected to migrate from a zinc smelter. Several of these samples detected contaminants at levels that are well above background levels. These contaminants included arsenic, cadmium, copper, lead, magnesium, and zinc. As a general trend, it appears that the residential areas to the north and west have the highest concentrations of contaminants. It also appears that generally, the concentrations of contaminants decrease as the distance from the Site increases.

Table 2 shows the analytical results of the residences and schools for arsenic, cadmium, lead, and zinc compared to health based benchmarks. The benchmarks that these analytical results are being compared to in the table are soil screening levels (SSL) from the May, 1996 USEPA "Soil Screening Guidance: Technical Background Document." The values are from Appendix A of this document and indicate the SSLs from ingestion. The SSLs for the four contaminants listed in the table are the same values as the Illinois EPA "Tier 1 Soil Remediation Objectives (SRO) for Residential Properties" (Table A of Appendix B of the Tiered Approach to Corrective Action Objectives (TACO) regulations, updated June, 1998). The SROs for ingestion are also shown in Table 2. Contaminant levels detected in the soils in residential yards and at the schools that exceed the SSLs and SROs are shown in bold type.

Table 2: Off-site Soil Contaminant Levels

	arsenic	cadmium	lead	zinc
Sample #	**contaminant levels in ppm**			
X101(bkgd.)	7.6	1.9	39	125
X102	**10.2**	21.3	**1,260**	1,490
X103	**11.5**	42.4	**439**	3,910
X104	**23.2**	**120.0**	**529**	4,800
X105 school	**14.5**	11.0	**482**	1,650
X106	**14.1**	49.9	**670**	3310
X107	**38.4**	**205.0**	**1,230**	10,800
X108	**9.1**	53.1	207	1,990
X109	**15.9**	35.7	235	1,490
X110	**16.7**	33.4	189	1,250
X111	**11.9**	15.4	199	723
X112	**14.1**	37.6	244	1,640
X113	**9.8**	50.2	188	1,920
X114	**13.7**	33.8	**499**	1,890
X115	**15.0**	13.1	**537**	962
X116	**14.6**	13.6	**614**	1,020
X117 school	**7.3**	9.1	87	439
SSL	**0.4 ppm**	**78.0 ppm**	**400.0 ppm**	**23,000 ppm**
SRO	**0.4 ppm**	**78.0 ppm**	**400.0 ppm**	**23,000 ppm**

In addition to area residents, on-site employees may also be potentially affected by the Site's contaminants. According to XTRA Intermodal's operations manager, approximately 40 employees work on-site, although not all of them work in areas where they would come into contact with the contaminants. Table 3 shows the analytical results of the on-site samples for arsenic, cadmium, lead, mercury, and zinc compared to the Preliminary Remediation Goals (PRG) for industrial soil found in the USEPA "Region 9 Preliminary Remediation Goals (for) 1998." Contaminant levels that exceed the PRGs are shown in bold type. See Figure 3 for the locations of these samples.

Table 3: On-site Waste/Soil Contaminant Levels

	arsenic	cadmium	lead	mer^ury	zinc
Sample #	contaminant levels in ppm				
X501	55.3	18.4	2,820	.4	10,000
X502	117.0	112.0	1,720	10.1	30,000
X503	99.1	63.8	1,500	5.5	13,100
X504	57.9	26.8	1,250	.2	3,560
X505	1,040.0	659.0	16,400	1,040.0	83,500
PRG	3 ppm	930 ppm	1,000 ppm	560 ppm	100,000ppm

NPL CALIBER DETERMINATION

USEPA Region 5 decisions for response actions at the Site will be based on Superfund Accelerated Cleanup Model (SACM) guidance.

SITE ASSESSMENT

After evaluating the existing data, inspecting the Site, and reviewing information, it is clear that the Old American Zinc Plant Site poses a threat via the soil exposure pathway. Significant threats may also exist via other pathways. The preliminary Hazard Ranking System (HRS) Site score is 61.97, which is based on the following pathway scores: groundwater migration, 41.00; surface water migration, 60.00; soil exposure, 100.00; and air migration, 8.93.

QUALITATIVE RISK ASSESSMENT/HEALTH CONSULTATION

The conclusions and recommendations in the February 14, 1996 Illinois Department of Health (IDPH) "Health Consultation: Old American Zinc, Fairmont City, St. Clair County, Illinois, CERCLIS # IL0000034355" are presented below. The Health Consultation is an attachment to this report. The conclusions and recommendations were reviewed by the Division of Health Assessment and Consultation of ATSDR.

Conclusions: Based on information reviewed, IDPH concludes that:

1. The Old American Zinc Plant Site in Fairmont City, Illinois poses a public health threat based on chronic exposure of children to arsenic, cadmium, and lead in the residential soils.

2. Nearby residents are exposed to contaminated airborne particulates which originate on-site. This exposure would be the highest during dry, windy periods or when Site activity is high. The extent of this exposure and resulting health effects, if any, cannot be determined without sufficient air monitoring data.

3. Worker exposure to on-site contaminants certainly occurs. The highest exposures would likely occur during activities which disturb the waste material.

4. Exposures to Site-related contaminants would have likely been higher in the past, particularly during smelter operation.

Recommendations to Cease/Reduce Exposure:

1. Reduce exposure of children to contaminated, residential soils as much as possible by using appropriate reduction methods (e.g. covering bare soil with vegetation, "clean" soil, mulch, rock, or asphalt; restricting access to areas with bare soil by fencing; reducing or eliminating soil contact activities such as digging; washing hands and face prior to eating or drinking; and cleaning shoes to reduce the amount of soil tracked into the house).

2. Remove or contain contaminants that have been left exposed on the surface soil in such a way that they are not released to the air or allowed to move by surface runoff.

3. Protect the on-site workers and nearby residents from Site contaminant exposure by taking precautions (e.g. dust reduction methods, protective equipment) to reduce exposures during any on-site activities that involve disturbing the Site wastes.

Site Characterization Recommendations:

1. Monitor air at exposure points to determine airborne exposure to contaminants. Exposure points would include nearby residents and, if warranted, on-site workers. Baseline air monitoring would be important to determine exposure and could later be used with additional air monitoring to determine the effectiveness of the chosen remedial activity.

2. Perform additional soil sampling in the neighborhoods adjacent to the Site to provide a more accurate determination of the extent of off-site soil contamination.

3. Perform additional sampling for mercury in the arsenic leaching area to determine the extent of mercury contamination in that area.

TOXICOLOGICAL ASSESSMENT

1. Off-site Residential Areas

a. Appropriate Screening Values for the Off-site Residential Areas

   The July 14, 1994 OSWER Directive # 9355.4-12 "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," also recommends the SSL of 400 ppm lead in soil for residential sites. It makes the recommendation for use of the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children for use in evaluating risk and developing clean-up goals (CUG).

   The Region 9 Preliminary Remediation Goals (PRG) 1998 table is also sometimes used by Region 5 for site screening. The entry for cadmium lists an alternate calculated value for soil, which was revised by Region 9:

Cadmium	37 ppm	
	9 ppm	"CAL-Modified PRG" (California EPA PEA, 1994)

b. Evaluation of Off-site Residential Soils

Table 2 indicated that elevated levels of the following contaminants were found in residential soils:

Arsenic	range = 7.3 - 38.4 ppm; max at X107
Cadmium	range = 1.9 - 205 ppm; max at X107
Lead	range = 39.5 - 1260 ppm; max at X102

Residential properties X107 and properties directly west of the Site have soil levels of these metal contaminants that exceed either a 10^{-6} risk or a Hazard Quotient (HQ, a noncarcinogenic risk index) of 1.0.

Properties X102, X103, X104, X105, X106, X107, X114, X115 and X116 have soil lead levels which exceed USEPA's soil screening level for lead of 400 ppm, as recommended in the OSWER Directive. Use of the IEUBK Model to provide a risk assessment for lead in soil and/or development of residential soil CUGs for lead will be required. The appropriate receptor population is the residential child under the age of seven; the major pathway of concern is incidental ingestion of soil and soil-derived indoor dust.

It is likely that lead will be the driver on the off-site residential properties because other metal contaminant levels will not result in a risk greater than 10^{-4}, although the HQ for cadmium is exceeded at some properties.

Some house dust samples were collected in 1996 in three residences; however, the data is reported as loading data ($\mu g/ft^2$). Concentration data may be available from IDPH, which would aid in the risk assessment.

Based on the preceding analysis in this report, USEPA and Illinois EPA agree that the levels of arsenic, cadmium, and lead found in off-site soils may cause adverse health effects.

2. On-site Industrial Areas

a. Appropriate Screening Values for the On-site Industrial Areas

The Region 9 PRGs 1998 table gives the following values for screening industrial soils. The values apply to a commercial/industrial on-site worker.

Arsenic	3	ppm (cancer endpoint; 10^{-6} risk)
Cadmium	930	"
Lead	1,000	"
Zinc	100,000	"

In addition, the "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil," December 1996, presents a methodology for calculating CUGs for adult exposure to lead. Figure 1 in this document shows a lower CUG of 750 ppm, using model defaults. This would be an acceptable lower screening level for worker exposure to lead at the site.

b. Evaluation of On-site Soils

Table 3 indicated that elevated levels of the following contaminants were found in all soil sampling locations on-site:

Arsenic	range = 55.3 - 1040.0 ppm; max at X505
Lead	range = 1,250 - 16,400 ppm; max at X505
Zinc	range = 3,560 - 83,500 ppm; max at X505

Sample X505, collected from the former location of an arsenic leaching plant, contains the highest metal concentrations found on the Site, including an additional contaminant of concern not listed above (mercury). Soil levels of these metal contaminants greatly exceed either a 10^{-6} risk or a HQ of 1.0.

Again, lead is likely to be the driver for the Site, as the other contaminants do not exceed the 10^{-4} risk (arsenic) or do not exceed the HQ of 1.0 (zinc).

All of the Table 3 lead contaminant levels exceed the 1,000 ppm Region 9 PRG and the 750 ppm CUG. Based on this comparison, some cleanup action is needed for on-site waste.

CUGs for both the full-time commercial/industrial worker (with exposure both outside and inside the office) and the future construction worker should be calculated using the Adult Interim methodology, and the more conservative value should be chosen to determine the cleanup action.

3. Acceptable Screening Values for Migration of Soil Contaminants to Groundwater

The following values are from the SSL Guidance (referenced above). They are also shown in the Region 9 table (using a dilution-attenuation factor (DAF) = 20, which is probably a reasonable value):

Arsenic	29	ppm
Cadmium	8	"
Zinc	none	

There is a Safe Drinking Water Act action level for lead in drinking water of 15 μg/L. This is an appropriate CUG.

4. Evaluation of the Groundwater and Surface Water

No data was available to evaluate the potential exposure risk from ingestion of groundwater or incidental ingestion of surface water, although the latter would be a minor pathway. Since some of the chemicals are soluble, concentrations may be elevated in the groundwater. No Toxicity Characteristic Leaching Procedure (TCLP) data is provided for on-site soil samples. Even relatively immobile contaminants may have leached in contact with the acid releases on-site. The levels which present a risk in drinking water are listed above, although the CUGs in water are usually the Federal drinking water MCLs, when available.

5. Evaluation of Sediment Levels

For the human health risks, the levels in soil can be used to screen the sediments data for adverse health effects. Almost all metals contaminants were detected in some sediment samples in Rose Creek at very high concentrations. Sample X202 contains extremely high levels of lead as well as most other metals. The Creek appears to be accessible by children, and these greatly elevated levels could present a risk, even with intermittent exposure.

Consideration of a trespasser or recreational exposure would allow evaluation of exposure to a trespassing child and use of the IEUBK Model for lead assessment. The values for lead are high enough that they would probably drive an action in the parts of the Creek that are accessible to young children.

6. Migration of On-site Soil

It appears that off-site migration of on-site contamination has occurred by perhaps both wind-blown deposition and soil runoff. Because of the high on-site levels of contaminants, it would seem that protection of any remedy on off-site properties would necessitate some actions to prevent the continuing releases from the Site.

7. Data Gaps

a. Groundwater data is missing to evaluate the migration of soluble/leachable soil contaminants. On-site and off-site groundwater samples should be taken to evaluate this possibility.

b. TCLP data is also missing to evaluate the potential for contaminant migration to groundwater. Metal contaminants in combination with acid releases has likely occurred. Few samples were collected at depth, so the migration cannot be evaluated.

c. Off-site residential and on-site soil samples were analyzed as the total lead sample. The Lead Models assume that the concentration modeled is the concentration in the fine particle size fraction (less than 250 microns); this is the fraction that sticks to hands and is incidentally ingested. Unless the lead enrichment in the fine fraction is known, the extent of contamination cannot be accurately determined. Any future sampling of soil should include an analysis of both the total and the fine particle (sieve) fractions.

d. The indoor dust lead measurements are not useful unless the IDPH can provide sample weights to allow calculation of indoor lead concentrations in dust. Lack of data necessitates the use of Model default values, which may be higher or lower than measured values.

ECOLOGICAL ASSESSMENT

Based on the information provided in the Site file, it appears that further investigation of ecological risk is warranted. However, additional information is required in order to proceed with an assessment.

Table 1 shows that several metals were detected in sediment samples at concentrations exceeding ecological screening benchmark values. The use of Ontario Aquatic Sediment Quality Guideline LELs is recommended in order to be consistent with the conservative nature of a screening level risk assessment. Using LELs elevates potential risk above that presented in the CERCLA ISA report. In addition to the six metals screened by Illinois EPA, several other inorganics were detected above background levels and require further evaluation (i.e. antimony, barium, beryllium, cobalt, manganese, nickel, selenium, and possibly chromium and iron).

Additional information required to perform a screening level ecological risk assessment (even a qualitative one) includes, but is not limited to the following:

- In general, much more detailed, complete descriptions of the habitats in the vicinity of the Site are needed, including characterization of Rose Creek, the wetlands, and any other habitats present. Additional information might include: type(s) of wetlands; plant and animal surveys to determine the types and extent of species present; substrate characteristics; and water flow (i.e. amount, rate, and direction). One sediment sample was taken from Schoenberger Creek to determine if contaminants from the Site entered that creek via Rose Creek, which borders the southern edge of the Site property. However, the surface water description contained in the ISA report states that while Rose Creek may have previously flowed into Schoenberger Creek, it now flows into Old Cahokia Creek due to a constructed levee. This inconsistency needs to be clarified.

- The presence of any threatened, endangered, or rare species in the vicinity of the Site also needs to be determined.

- Surface water samples (and possibly additional soil and sediment samples) will help characterize the extent of contamination more clearly, and will be needed to assess risk to aquatic and terrestrial organisms.

Background sediment samples were taken from upstream of the Site and on-site. The appropriateness of using these locations for background should be discussed.

To generate ecologically protective CUGs, either sediment toxicity tests or bioaccumulation studies should be performed.

COMMUNITY RELATIONS STRATEGY

The USEPA Region 5 Public Affairs Office will use a variety of strategies (fact sheets, press releases, public meetings, availability sessions) to keep the community informed of activities at the Site. The Site lies within the Gateway Regional Initiative area, and appears to have Environmental Justice considerations.

REMEDIAL/REMOVAL STRATEGY

Remedial areas of concern are as follows:

1. Off-site, Residential Soil:

Off-site, residential soil is contaminated with inorganic contaminants including lead, cadmium, arsenic, and zinc. Lead contaminant levels have been measured up to 1,260 ppm; cadmium levels up to 205 ppm; arsenic levels up to 38.4 ppm, and zinc levels up to 10,800 ppm. All of these values except for the zinc value are above USEPA SSLs.

Since the 1994 IDPH sampling did not include sieved sampling for lead, the SAT recommends sieved samples be taken for lead in off-site residential yards, to characterize the lead concentration in the exposure (fine) fraction.

Some excavation of residential soils will be likely, using lead levels as the determining factor. The CUG for lead has not yet been determined by the SAT; however, USEPA guidance and cleanup levels established for similar Superfund Sites identify cleanup levels typically between 400 and 1,000 ppm. In the absence of sieved sampling for lead in soils, the CUG for lead will probably be closer to 400 ppm.

2. On-site Waste:

Large piles of zinc slag exist on-site. Zinc contaminant levels have been measured up to 83,500 ppm. Site waste is also contaminated with arsenic, cadmium, lead, and mercury. Lead levels have been measured up to 16,400 ppm. XTRA Intermodal employees currently work on-site.

Concerns with the zinc slag on-site include direct contact pathways such as dermal contact and incidental ingestion; generation of airborne contaminants, possible leaching into groundwater, and runoff into Rose Creek and eventually into the wetlands.

The lead PRG and CUG noted in the Toxicological Assessment section of this report have been exceeded in on-site samples, indicating that some on-site cleanup is probably required.

Remedies of other Superfund Sites with similar situations (Palmerton in Region 3 and Circle Smelting in Region 5) have called for leveling the zinc piles over the site and installing a waste cap over the waste, or removing the zinc slag from the site. These remedies have been known to reduce risk from the four pathways noted above.

3. Sediments in Rose Creek, Schoenberger Creek, and the Wetlands:

The ecological assessment section in this report notes that a more comprehensive ecological risk assessment needs to occur before a remedy can be selected. Most of the sediment inorganic contaminant levels were far above the LELs. Therefore, Site-specific studies should be performed to better characterize risks and to establish ecologically protective CUGs.

Human health concerns exist for sediment contaminant levels in Rose Creek. High concentrations of inorganic contaminants exist in the creek. Preliminary IEUBK modeling for lead exposure of a trespassing child indicates that lead values are high enough to warrant a cleanup action. An on-site capping or removal action should reduce human health risk due to sediments contamination.

ENFORCEMENT STRATEGY

The enforcement strategy for the Site is summarized in the following steps:

1. Verify Potentially Responsible Parties (PRP)

The Wheatland Title Guaranty Company conducted a Title Search in 1996 for Illinois EPA. The Title Search stated that XTRA Intermodal, Inc. owned the Site property in 1996. Currently, XTRA Intermodal, Inc. is using the Site for a truck-trailer leasing operation. A Region 5 preliminary search yielded the following PRPs:

a. XTRA Intermodal
b. Blue Tee Corporation
c. Mississippi Fuel Corporation
d. Mobil Oil Company
e. X-L Company, Inc.
f. Granby Mining and Smelting

These entities go by or have gone by other names, in some cases.

On January 22, 1997, the Illinois EPA sent 104(e) request for information letters to the Blue Tee Corporation and XTRA Intermodal, Inc. Responses from these two companies indicated that the companies are PRPs. The Department of Defense, in its work with the Defense Plant Corporation in the 1940s, is also a PRP, according to documents provided by Illinois EPA to USEPA.

Region 5 will conduct a comprehensive PRP search to verify PRPs for the Site. This will include a corporate record search to determine if any of the above-named businesses have successors that may be PRPs. The results of this search will also help Region 5 identify any de minimis PRPs.

2. Contact PRPs to Solicit Participation in Site Investigations and Response Actions

Region 5 will build on Illinois EPA's enforcement efforts to date. Additional 104(e) letters will be issued as needed. General Notice Letters (GNL) and other enforcement mechanisms will be used as appropriate to solicit PRPs' participation in Site investigations and response actions.

3. Issue Enforcement Agreements to Convert the Site to a PRP Lead for Site Investigations and Response Actions

Region's 5's emphasis will be to establish the Site as a PRP-lead for funding, Site investigations, and response actions. Ultimately, Region 5 plans to draft an Administrative Order on Consent (AOC) to be signed by Region 5 and the PRPs, for the PRPs to perform an Engineering Evaluation and Cost Analysis (EE/CA). This AOC would be accompanied by a GNL, and would be sent to the three entities that Region 5 has the strongest evidence of being PRPs (XTRA

Intermodal, Inc., Blue Tee Corporation, and the Department of Defense). Region 5 would then draft a CD for PRPs to implement a response action selected by Region 5. The enforcement agreements should contain provisions for de minimis party settlements, it any.

RECOMMENDATIONS

The SAT requests that the RDT authorize the following actions at the Site:

1. Region 5 should send an AOC and GNL to the three PRPs identified in the Enforcement Strategy of this document. The AOC will include, but not be limited to, the following work to be performed:

a. "Hot-spot" Soil Removal in Residential Yards

Use lead contaminant levels as the driver to determine which areas require excavation. The properties corresponding to samples X102 and X107 of Table 2 of this document show the two highest contaminant levels. These two residential yards require soil removal and treatment of the removed soil. Region 5 may identify additional off-site or on-site "hot spots" requiring clean-up, prior to the AOC being signed.

b. Human Health and Ecological Risk Assessments

A Human Health Risk Assessment and an Ecological Risk Assessment are required to better understand the off-site and on-site risks. To collect meaningful data, more extensive sampling and analysis of waste, soil, surface water, groundwater, sediments, and air is required. In particular, wetlands, creeks, groundwater, and off-site soil need to be more extensively sampled and analyzed. Leachability of on-site waste must be established. Recommendations from the Toxicological and Ecological Assessment sections of this document should be incorporated in the sampling and analysis plan. After such comprehensive data is sampled and analyzed, the risk assessments should be prepared.

c. Engineering Evaluation/Cost Analysis (EE/CA)

An EE/CA should be performed that will identify clean-up alternatives, evaluate each alternative, and compare the alternatives to each other.

2. Completion of a Comprehensive PRP Search

Region 5 should conduct and complete a comprehensive PRP search. 104(e) request letters should be mailed as appropriate. General or special notice letters should be mailed as appropriate. Based on the results of these enforcement efforts, additional PRPs should be added to the AOC described above, as appropriate.

3. Further Study to Determine NPL Eligibility

If Region 5 cannot produce a signed AOC by one or more PRPs, the Region should consider listing the Site on the NPL. The preliminary HRS Site score of 61.97 is well above the 28.5 threshold for final listing of sites on the NPL.

State Concurrence: The Illinois EPA concurs with the Site strategy described in this memorandum.

[signature]
Illinois EPA Bureau of Land

5-22-99
Date

Figures:

Figure 1: Site Map
Figure 2: Sediment Sample Location Map
Figure 3: Soil Sample Location Map
Figure 4: Background Soil Sample Location Map

Attachment: Health Consultation

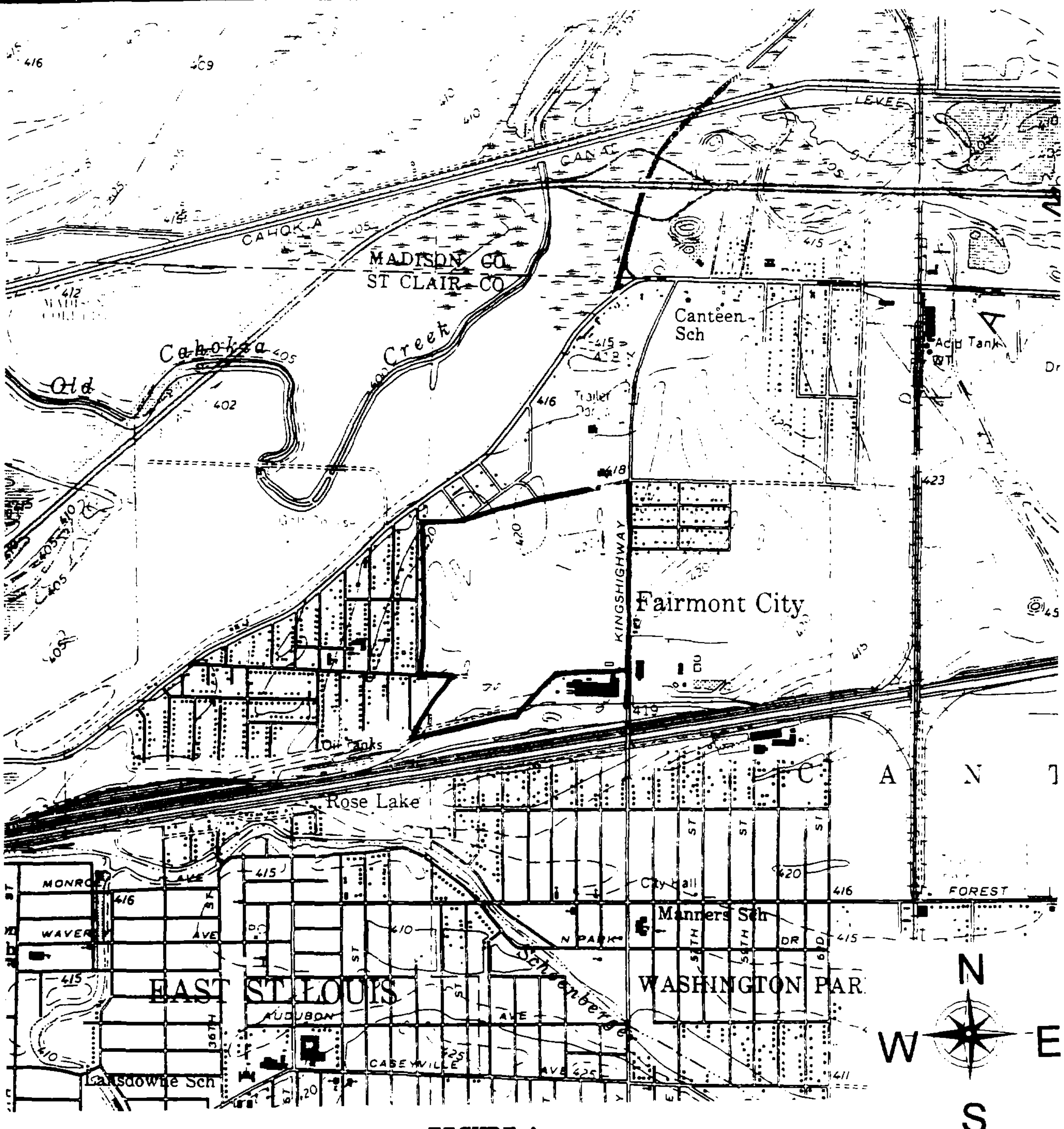

FIGURE 1

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355
REGIONAL AREA MAP	
Scale: 1:24,000	
LEGEND: ☐ Site Location	

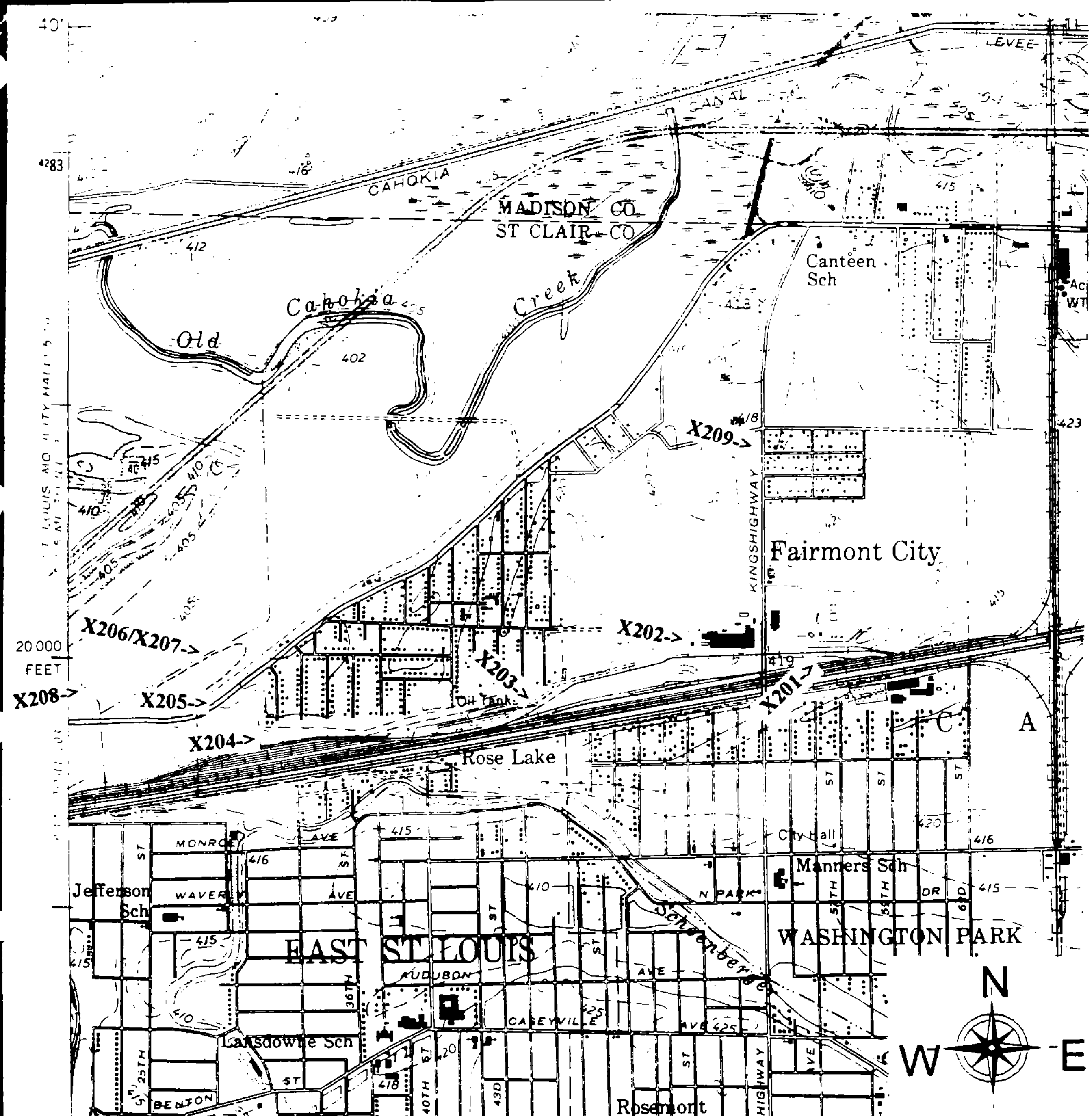

Figure 2

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355

SEDIMENT SAMPLE LOCATION MAP

Scale: 1:24,000

LEGEND: ☐ Site Location

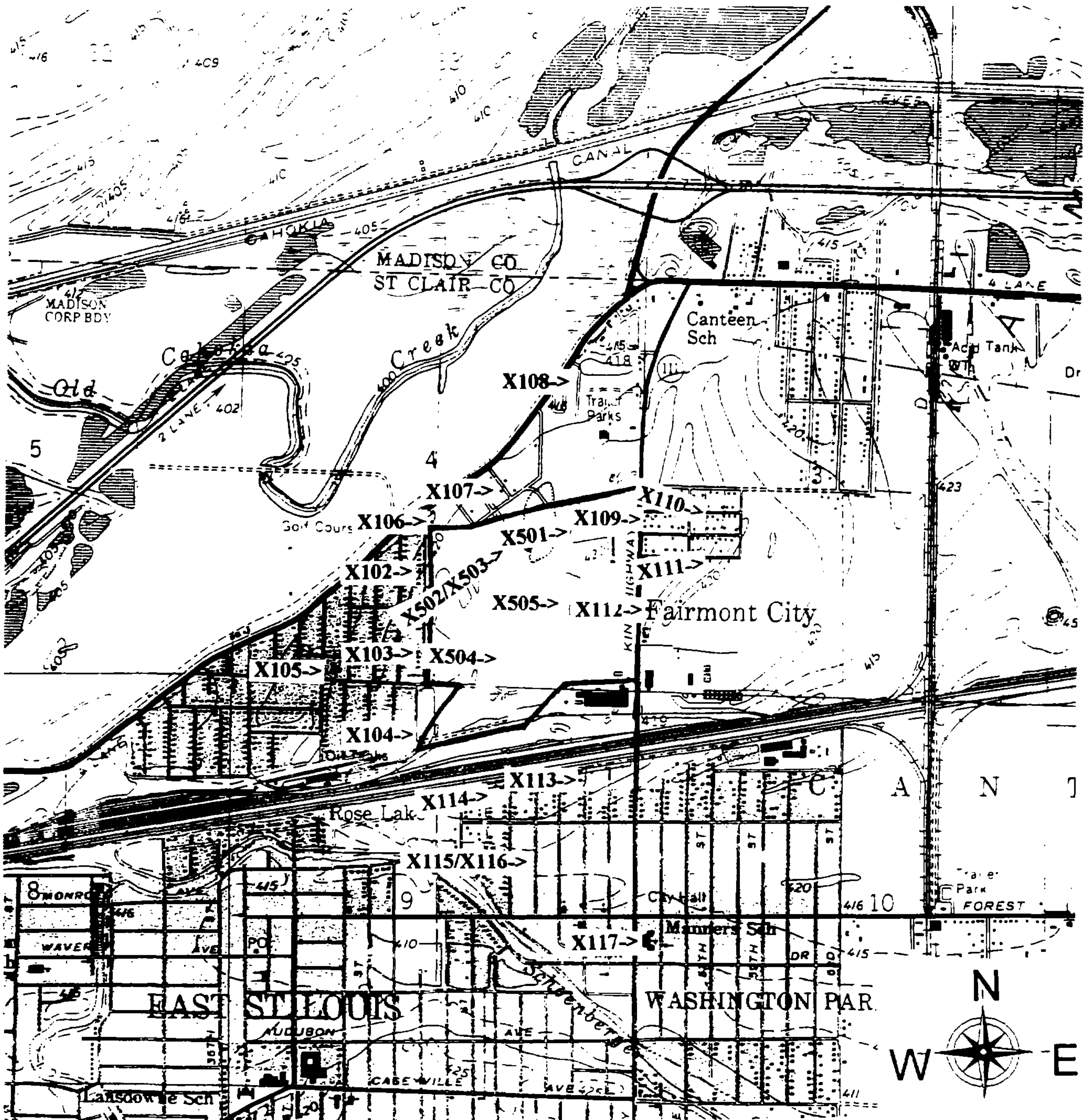

Figure 3

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355
SAMPLE LOCATION MAP	
Scale: 1:24,000	
LEGEND: ☐ Site Location	

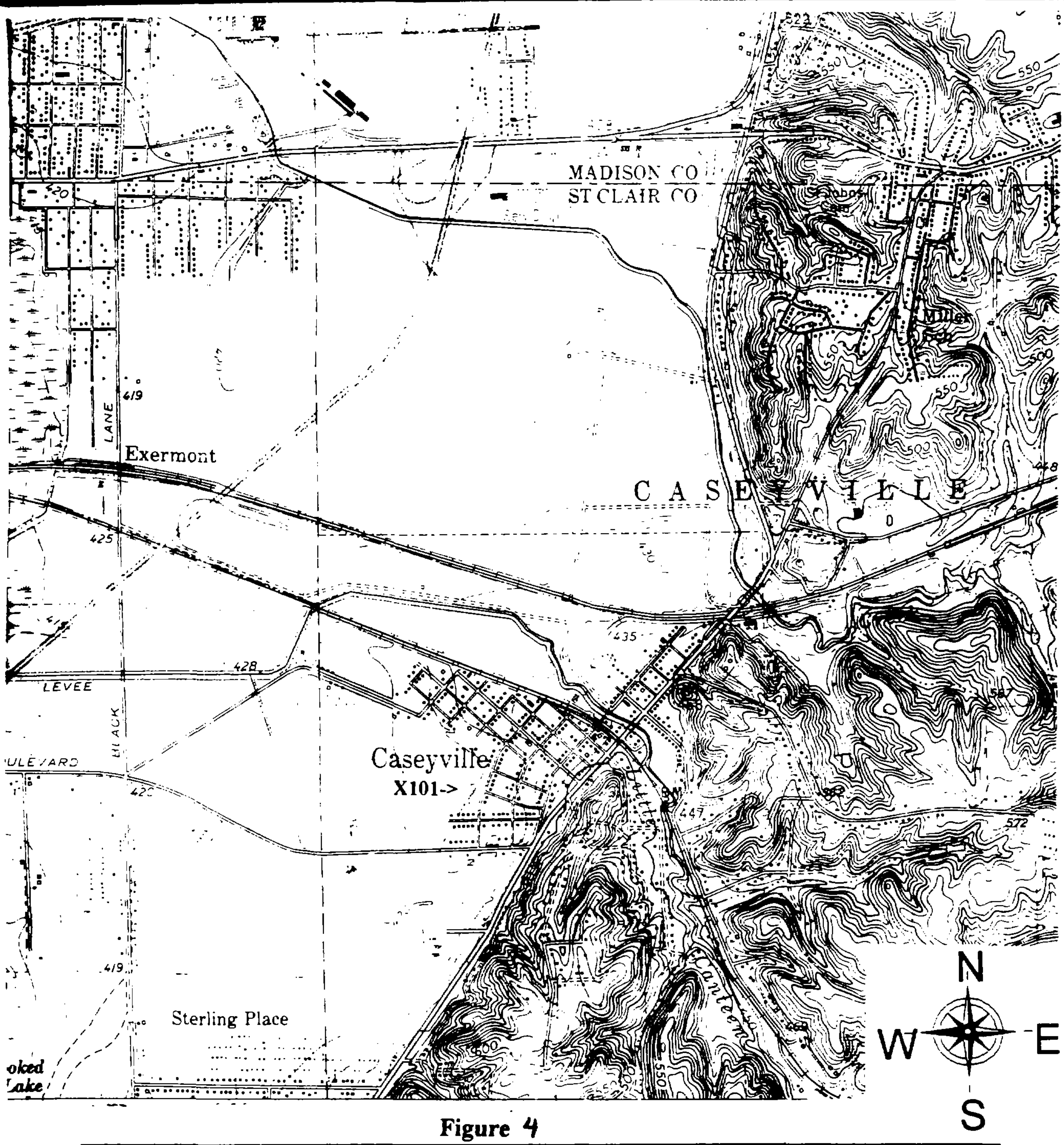

Figure 4

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355

BACKGROUND SAMPLE LOCATION MAP

Scale: 1:24,000

HEALTH CONSULTATION

OLD AMERICAN ZINC

FAIRMONT CITY, ST. CLAIR COUNTY, ILLINOIS

CERCLIS # IL0000034355

February 14, 1996

Prepared by:

Illinois Department cf Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The Agency for Toxic Substances and Disease Registry (ATSDR) requested that the Illinois Department of Public Health (IDPH) review the historical and environmental data associated with the the Old American Zinc (OAZ) site to determine if a public health threat exists. The original request was made to ATSDR by the U.S. Environmental Protection Agency (USEPA). The Old American Zinc site (Attachment 1) in Fairmont City, Illinois (population 2,313; 1990 Census) is being evaluated by USEPA for possible emergency response action.

OAZ operated as a primary zinc smelter from approximately 1913 until 1967. The smelting operations were moved from Fairmont City to Sauget, Illinois after the 1967 closure. Shortly after the plant closed, the buildings were either removed or demolished. While the facility was operating, it produced slab zinc, zinc oxides, zinc carbonate, cadmium, lead, and sulfuric acid. Slag was a by-product of the zinc smelting process. OAZ also produced a fuel called producer gas, which was used in the smelting process. The synthesis of producer gas leaves coal tars as by-products. How and where the coal tars were disposed of is not known.

The site was unoccupied from 1967 to 1976. In 1976, XTRA Intermodal leased the site. XTRA Intermodal leases semitrailers to railroads and stores them at this site when they are not being leased. In 1992, XTRA Intermodal bought the site which it still continues to occupy.

The site located on 132 acres in Fairmont City is now almost entirely covered with a layer of black slag from the zinc smelter. Two large piles of slag still exist in the northern section of the property. A large depression in the northern portion of the site has exposed soil, which does not appear to support plant life. The area north of the site is comprised of vacant lots and residences. Land use east of the site is residential in the northeastern portion, and industrial in the southeastern portion. Conrail (which loads and unloads semitrailers onto trains) and Aztec (a former fertilizer plant) lie to the south of the site. Residential areas in Washington Park are located south of Conrail and Aztec, across the railroad tracks. A residential area adjoins to the west site boundary.

Residents have stated that some of the slag material was used by Fairmont City to spread on the streets during icy weather. Neighbors surrounding the site have been interviewed and were noted as saying that slag occasionally blows from the site and that during dry windy days the sky becomes blackened by blowing slag particles. Some neighbors believe that the problems of blowing slag were increased when XTRA Intermodal spread the slag across the site. Complaints regarding blowing slag prompted some of the IEPA investigations and the 1994 sampling event. Investigations of the Old American Zinc site have included the CERCLA Integrated Assessment investigation and an IEPA/IDPH meeting and site visit on October 18, 1995. The meeting with IEPA and IDPH representatives discussed the site and the possibility of conducting air monitoring at the site.

Sampling Activities

On November 29 and 30, 1995 IEPA took 5 waste samples on site and 17 soil and 8 sediment samples off site. The location, depth, and descriptions of the samples are given in Table 1. Attachment 2 is the on-site waste and residential soil sample location map. Attachment 3 is the sediment sample location map.

Five waste samples were taken on site. Three samples were taken from the waste piles in the northern portion of the site with one of the samples being a duplicate. One sample was taken from the producer gas area and another from the arsenic leaching facility. The on-site samples were analyzed for volatiles, semi-volatiles, pesticides, and inorganic compounds.

Seventeen residential soil samples were taken from residential areas. Sixteen samples from 15 locations were taken in the vicinity of the site. The other sample was a background sample taken from the nearby community of Caseyville. These samples were analyzed for inorganic compounds.

Eight sediment samples from seven locations were collected from Rose Creek and the adjacent wetlands. One background sample was taken upstream of the site run-off. Sediment samples were analyzed for volatiles, semi-volatiles, pesticides, and inorganic compounds.

In the data tables that follow, the listing of a contaminant does not mean that it will cause adverse health effects from exposures. The tables summarize the entire data package submitted to IDPH from IEPA following the analyses of samples collected in November 1994 and include the following analysis abbreviations:

J = estimated value, qualitatively correct but quantitatively suspect;
B = analyte found in the associated blank and indicates possible/probable blank contamination; and
P = alternate analytical method used to analyze for this compound.

A summary of the on-site samples is contained in Table 2. A review of the on-site sample data indicates that only one volatile organic compound (methylene chloride) was detected in the samples. Polycyclic Aromatic Hydrocarbons (PAHs) were detected in three of the five samples and, as expected, the greatest concentrations were in the sample taken from the producer gas area. Pesticides were detected in four of the five samples with the high concentrations being found in the producer gas and the arsenic leaching areas. The source of pesticides in these areas is not known. Aroclor-1260 was detected in the arsenic leaching area. Generally, inorganic compound concentrations were much higher than background soil levels; this would be expected at a zinc smelting site. The mercury concentration in the arsenic leaching area should be noted.

Residential soils samples were analyzed for inorganic compounds. Table 3 is a summary of the results of the residential soil analyses. The inorganic concentrations in the residential areas were higher than the background soil sample. Generally, the highest inorganic concentrations appear to be from the soil of those residences closest to the site.

Sediment samples were taken from Rose Creek, an intermittant stream, and an adjacent wetland. The samples were analyzed for the same compounds as the on-site samples and the analyses are summarized in Table 4. No volatile organic compounds were detected in any of the sediment samples. PAHs were detected in three samples, one of which was the background sample. Sample X203 had the highest concentration of PAHs. The exact source of these compounds is unknown. A variety of pesticides were found at various locations including the background sample. Most of the pesticides were detected in the 1-10 parts per billion (ppb) range. The source of these pesticides is also unknown. Aroclors 1254 and 1260 were identified in five sediment samples. The source of the aroclors cannot be linked to a specific site activity. Most of the inorganic compounds were detected at much higher levels in the sediments downstream from the site. Inorganic compounds of interest include antimony, arsenic, beryllium, cadmium, cobalt, lead, and mercury. A comparison of the on-site samples and the sediment samples, particularly sample X201 indicates the levels of antimony, beryllium, and cobalt were much higher in sediments than in the on-site waste. This comparison would also seem to indicate that the source of these three compounds may not be the site.

DISCUSSION

Exposure and possible health effects from site related contaminants will be dicussed in this section with the primary focus being on-site wastes and residential soils; however, exposure to contaminants in the sediments and air will also be discussed. The sample results are listed in the following tables along with their screening comparison values.

Comparison values for health assessments are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEGs) for chronic exposures (CEMEGs), intermediate exposures (IEMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on a one excess cancer in a million persons exposed over a lifetime and are calculated from USEPA's cancer slope factors.

Table 5 lists the compounds detected in the on-site waste samples and the soil comparison values for children and adults. The comparison values used for the on-site waste samples were those for chronic exposures of children/adults. Children are not likely to be chronically exposed to the wastes on site, however they were included for comparison. The waste samples were taken as subsurface samples 2 to 24 inches deep depending on the sample. For this assessment, it will be assumed that the waste is homogenious; however, this may not be the case particularly with respect to volatile and semi-volatile compounds.

The exposed population to on-site wastes would be the on-site workers and nearby residents. The contaminants of concern in the on-site wastes include the PAHs in the producer gas area, and the antimony, arsenic, cadmium, lead, and mercury throughout the site. On-site workers conducting routine activities (e.g. driving and parking trucks) may have significant exposure to inorganic compounds when dust is generated from these activities. On-site workers moving or digging into the waste material may be exposed to contaminated dust. Workers digging in the producer gas area may also be exposed to PAHs, some of which are carcinogens. Workers should try to reduce exposure to on-site dusts and proper protective clothing should be worn when working directly with the waste. When working in the producer gas area, protective clothing should be worn because of possible exposure to PAHs. Special precautions should be taken in the arsenic leaching area to protect against possible mercury exposure.

Off-site exposure to on-site wastes may occur when dust blows from the site. The dust is primarily generated by on-site truck traffic and when conditions are very dry and windy. This dust would likely expose downwind residents to on-site contaminants. The primary contaminants of concern would be the inorganic compounds in the dust, particularly arsenic. cadmium, and lead. The exposure to residents in the area from on-site dust particularly during the periodic high particulate episodes, cannot be estimated. Air monitoring should be conducted to determine the level of these exposures.

Exposure to inorganic compounds in residential soil can occur by both inhalation and ingestion. Individuals that would have the highest exposures are children and adults. Children playing outside especially on bare soil or digging in soil would have the highest exposures. For adults those working with soil (e.g. gardeners) would be the most highly exposed to soil contamination.

The contaminants of concern in residential soils are arsenic, cadmium, and lead. Table 6 compares the residential soil sample results with the screening comparison values. The soil arsenic concentrations exceeded the chronic environmental media evaluation guidelines for children in samples X104 and X107. The cancer risk evaluation guideline for arsenic was exceeded in all residential soil samples including the background sample. The childs' C EMEG for cadmium in soil was exceeded in five residential soil samples. There is no guideline for lead in soil however the Illinois Lead Poisoning Prevention Code action level for lead in soil is 1,000 ppm. This action level was exceeded in two residential areas. None of the adult chronic exposure evaluation guidelines was exceeded for arsenic or cadmium in soil. It should be noted that soil levels which exceed the EMEG guidelines for children do not predict adverse health outcomes. In addition, behavior modification and creation of physical barriers can greatly reduce exposure to inorganic compounds in soil.

Table 7 is a summary of the sediment analyses with the screening comparison values. Samples X202 and X203 (shown in Attachment 3) are closest to the site. Contaminants of concern in the sediments include benzo(a)pyrene in sample X203, and the inorganic contaminants arsenic, cadmium, lead, and mercury. The environmental media evaluation guidelines used to select the contaminants of concern were the chronic soil guidelines for children. Soil guidelines were used since the creek is dry most of the time and sediments may act much like soil during dry times. The most likely exposure of individuals to contaminated sediments would probably be from occasional direct contact along the section of Rose Creek which lies west of the site and south of the residential area.

To evaluate health effects, Minimal Risk Levels (MRL) have been developed by the ATSDR for compounds commonly found at hazardous waste sites An MRL estimates the daily human exposure to a contaminant below which adverse, non-cancer, health effects are not likely to occur. MRLs are developed for different routes of exposure, including ingestion and inhalation, and for three different exposure periods, acute (less than 14 days), intermediate (15-365 days), and chronic (more than 365 days).

The potential for possible exposure and health effects associated with the primary contaminants of concern at this site (arsenic, cadmium, and lead) are described in the following sections. The two primary routes of exposure from site related contaminants are inhalation and ingestion. One source of inhalation to site related contaminants would be during heavy truck traffic and windy days, especially during dry periods. The actual amount of contaminant exposure during these events was not calculated because of the absence of air monitoring data.

Arsenic

The population exposed to arsenic would be on-site workers and nearby residents. Exposure may occur by ingestion or inhalation. Adverse health effects associated with arsenic are most notably that it is a known human carcinogen through inhalation.

The non-carcinogenic effects that may be associated with inorganic arsenic include irritation of the stomach and intestines with symptoms including nausea, vomiting, and diarrhea, a decrease in the production of red and white blood cells, abnormal heart function, blood vessel damage, and impaired nerve function causing a "pins and needles" sensation in the hands and feet.

Long-term ingestion may also lead to a pattern of skin changes including a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. Theses skin changes are not a health concern by themselves however they may later develop into skin cancer. Ingestion of arsenic has also been reported to increase the risk of liver, bladder, kidney, and lung cancers.

The chronic oral MRL for arsenic is 0.0003 mg/kg/day. The soil ingestion dose calculated for a child using the highest residential soil arsenic concentration was slightly less than the oral MRL for arsenic. This calculation does not suggest that chronic health effects would be observed from residential soil exposures; however, the calculated oral dose does not account for other oral exposures to arsenic (e.g. dust inhalation and incidental ingestion).

Cadmium

The population exposed to cadmium would be the same as for arsenic. Exposure would occur by ingestion and inhalation of contaminated soil and inhalation of fugitive dusts from the site.

Non-carcinogenic health effects that may be associated with oral cadmium exposure are a build-up of cadmium in the kidney, which may cause kidney damage, and fragile bones. This build-up of cadmium in the kidneys is also observed in inhalation exposures and results in the same health effects. So while ambient airborne concentrations of cadmium did not exceed the MRL for cadmium in air, it effects the body in the same way as ingested cadmium and the inhalation exposure may be added to the ingested exposure.

The chronic MRL for cadmium inhalation is 0.0002 mg/m^3. The data on cadmium inhalation and cancer in humans is limited. The chronic oral MRL for cadmium is 0.0007 mg/kg/day. The soil ingestion dose calculated for a child using the highest residential soil cadmium concentration was approximately twice the oral MRL for cadmium. This calculation would suggest that chronic health effects in children would be expected from residential soil exposures. If this calculation is representative of exposure, then one would expect to see some or all of the chronic health effects associated with cadmium. Using the mean residential soil cadmium level to calculate the chronic soil ingestion dose for a child, the exposure dose is less than half the MRL. No chronic adverse health effects would be expected using the average residential soil cadmium level. These calculated oral exposure doses do not account for other possible oral exposures to cadmium.

Lead

Lead is a naturally occurring substance found in small amounts in the earth's crust. It is most harmful to children under 6 years of age because their body systems are rapidly developing. Exposure is greater in children due to their tendencies of frequent hand to mouth contact. Lead can adversely affect several major body systems if absorbed by the body. The most serious effect is neurological impairment. In children, prenatal exposure, as well as postnatal blood lead levels of 10 to 15 micrograms per deciliter have been associated with numerous disabilities, including cognitive deficit (decreased IQ), decreased growth, reduced birth weight, and reduced hearing. The Centers for Disease Control and Prevention (CDC) has recommended an action level of 10 micrograms of lead per deciliter of blood for children. In adults, lead exposure may decrease reaction time and possibly memory and may also cause weakness in fingers, wrists, and ankles. At high levels of exposure, lead can severely damage the brain and kidneys in adults and children. Adults would not be expected to receive significant exposures at this site since lead is not absorbed through the skin. Adult exposures to lead are usually limited to inhaling lead dust. No safe level of ingested lead has been identified. Ingestion of lead may be a significant source of exposure for children living near this site since elevated concentrations (> 1,000 ppm) have been detected in some residential yards. However, having a well vegetated yard (no bare areas) would help reduce exposure.

CONCLUSIONS

Based on information reviewed, the Illinois Department of Public Health concludes that:

1. The Old American Zinc site in Fairmont City, Illinois poses a public health threat based on chronic exposure of children to arsenic, cadmium, and lead in the residential soils.

2. Nearby residents are exposed to contaminated airborne particulates which originate onsite. This exposure would be the highest during dry windy periods or when site activity is high. The extent of this exposure and resulting health effects (if any) cannot be determined without sufficient air monitoring data.

3. Worker exposure to on-site contaminants certainly occurs. The highest exposures would likely occur during activities which disturb the waste material.

4. Past exposures to site related contaminants would have likely been higher in the past, particularly during smelter operation.

RECOMMENDATIONS

Cease/Reduce Exposure Recommendations

1. Reduce exposure of children to contaminated residential soils as much as possible by using appropriate reduction methods (e.g. covering bare soil with vegetation, "clean" soil, mulch, rock, or asphalt; restricting access to areas with bare soil by fencing; reducing or eliminating soil contact activities such as digging; washing hands and face prior to eating or drinking; and cleaning shoes to reduce the amount of soil being tracked into the house.

2. Remove or contain contaminants that have been left exposed on the surface soil in such a way that they are not released to the air or allowed to move by surface run-off.

3. Protect both the on-site workers and nearby residents from site contaminant exposure by taking precautions (e.g. dust reduction methods, protective equipment) to reduce exposures during any on-site activities that involve disturbing the site wastes.

Site Characterization Recommendations

1. Monitoring of air at exposure points to determine airborne exposure to contaminants. Exposure points would include nearby residences and, if warranted, onsite workers. Baseline air monitoring would be important in determining exposure and could later be used with additional air monitoring to determine the effectiveness of the chosen remedial activity.

2. Performing additional soil sampling in the neighborhoods adjacent to the site to provide a more accurate determination of the extent of off-site soil contamination.

3. Performing additional sampling for mercury in the arsenic leaching area to determine the extent of mercury contamination in that area.

David R. Webb, M.S.
Environmental Toxicologist

Tables 1-7
Attachments 1-3

REFERENCES

[1] ATSDR. 1995. IEPA Sampling Data and Additional Information Packet. Sent on October 16, 1995

[2] IEPA. Handouts at October 18, 1995. IEPA - Collinsville Office.

[3] ATSDR Draft Toxicological Profile for Cadmium. 1991. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[4] ATSDR Draft Toxicological Profile for Arsenic. 1991. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[5] ATSDR Update Toxicological Profile for Polycyclic Aromatic Hydrocarbons. 1993. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[6] ATSDR Update Toxicological Profile for Lead. 1993. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

Old American Zinc
IL 0000 034 355

Table 1 - Sample Descriptions

SAMPLE	DEPTH (Inches)	APPEARANCE	LOCATION
X101	0-2	Dark brown loam.	Taken as a background sample from a school in Caseyville.
X102	0-2	Dark brown loam.	Residence at 2831 N. 45th St.
X103	0-2	Dark brown loam	Residence at 4507 Cookson Rd.
X104	0-2	Dark brown loam.	Residence at 2509 N. 46th St.
X105	0-2	Dark brown loam.	Holy Rosary Parish School.
X106	0-2	Dark brown loam.	Residence at 2654 N. 48th St.
X107	0-2	Dark brown loam.	Residence at 3017 N. 49th St.
X108	0-2	Dark brown loam.	Residence at 5100 Collinsville Rd. Lot 39
X109	0-2	Dark brown loam.	Residence at 2732 Kingshighway.
X110	0-2	Dark brown loam.	Residence at 5508 Delmar St.
X111	0-2	Dark brown loam.	Residence at 5508 Thomas St.
X112	0-2	Dark brown loam.	Residence at 2810 Kingshighway.
X113	0-2	Dark brown loam.	Residence at 2339 N. 48th St.
X114	0-2	Dark brown loam.	Residence at 2328 N. 48th St.
X115 X116	0-2	Dark brown loam.	Residence at 2229 N. 50th St.
X117	0-2	Dark brown loam.	Manners Elementary School.

Table 1 - Sample Desc.iptions

SAMPLE	DEPTH (inches)	APPEARANCE	LOCATION
X501	2 – 6	Black cindery material with green and orange specks in it.	Taken from a large slag pile on the northeast portion of the site.
X502/ X503	2 – 6	Black cindery material with yellow, green and white specks in it.	Taken as duplicate samples. Taken from a large slag pile on the northwest portion of the site.
X504	6 – 12	Black cindery material.	Taken on site where a producer gas manufacturing area was formerly located.
X505	18 – 24	Black cindery material.	Taken on site where an arsenic leaching facility was formerly located.
X202	0 – 6	Dark brown silt with black cindery material in it.	Taken in Rose Creek where it runs along the southern border of the Old American property.
X203	0 – 6	Dark brown silt with organic material in it.	Taken in Rose Creek downstream from Old American Zinc.
X204/ X205	0 – 6	Dark gray clayey material with small rocks in it.	Taken as duplicate samples. Taken in Rose Creek downstream from Old American Zinc.
X206	0 – 6	Dark brown silt with organic material in it.	Taken from a wetlands area along Rose Creek.
X207	0 – 6	Dark brown silt with organic material in it.	Taken from a wetlands area along Rose Creek. Taken downstream of X206.
X208	0 – 12	Dark brown to black silty material with quite a bit of organic material in it.	Taken where Rose Creek enters Schoenberger Creek.
X209	0 – 6	Dark brown silty material with organic material in it.	Taken as a background sediment sample. Taken in a drainageway along the northeast corner of the Old American Zinc property.

Table 2 - Old American Zinc - On-site Samples						
Compound	X501 - WASTE	X502 - WASTE	X503 - WASTE	X504 - WASTE	X505 - WASTE	Range
VOLATILES (ug/kg)						
Methylene chloride	26.0		11.0J	12.0J		ND-26
SEMIVOLATILES (ug/kg)						
Phenanthrene			360J	34000	710	ND-34000
Anthracene				8700J		ND-8700J
Fluoranthene			330J	62000	1200	ND-62000
Pyrene			170J	48000	490	ND-48000
Benzo(a)anthracene (PAH)				39000	420	ND-39000
Chrysene (PAH)				28000	550	ND-2800
Benzo(b)fluoranthene (PAH)				37000	450	ND-37000
Benzo(a)pyrene (PAH)				15000J	1505	ND-15000
Indeno(1,2,3-cd)pyrene				7000J		ND-7000J
Benzo(g,h,i)perylene				11000J		ND 11000J
PESTICIDES/PCBs (ug/kg)						
alpha-BHC			0.2JP			ND-0.2JP
gamma-BHC (Lindane)					13P	ND-13P
Aldrin				130P		ND-130P
Heptachlor epoxide		2.8	2.1P	97P		ND-97P
Endosulfan I		0.9JP	0.9JP		49	ND-49
Dieldrin		1.6JP	1.2JP			
4,4'-*DDE*		2.7JP	2.9JP		10P	ND-10P
Endrin				220	9.8P	ND-220
Endosulfan II				62P	13P	ND-62P
4,4'-DDD				99P		ND-99P
Endosulfan sulfate			0.7JP		7.5P	ND-7.5P
4,4'-DDT				110	16P	ND-110

Table 2 - Old American Zinc - On-site Samples						
Compound	X501 - WASTE	X502 - WASTE	X503 - WASTE	X504 - WASTE	X505 - WASTE	Range
Endrin ketone				190		ND-190
Endrin aldehyde					99P	ND-99P
gamma-Chlordane				14P		ND-14P
Aroclor-1260					300P	ND-300P
INORGANICS (mg/kg)						
Aluminum	13200	4990	4510	4990	9740	4510-13200
Antimony		15.3	20.1	30.9	168	ND-168
Arsenic	55.3	117	99.1	57.9	1040	55.3-1040
Barium	150	116	144	88.9	415	88.9-415
Cadmium	18.4	112	64	26.8	659	18.4-659
Calcium		4670	10100		4310	ND-10100
Chromium	20.7	12.1	12.4	43.4	145	12.1-145
Cobalt		22.4	19.5		26.6	ND-26.6
Copper	5040	4500	3230	485	4460	485-5040
Lead	2820	1720	1500	1250	16400	1500-16400
Manganese	133	722	793	204	712	133-793
Mercury	0.4	10.1	5.5	0.2	1040	0.2-1040
Nickel	29.7	63.4	52.7	36.8	277	29.7-277
Selenium	3.7	6.1	6.5	3.5	29.5	3.5-29.5
Silver	17.6	54.7	53.9	10.4	129	10.4-129
Sodium	15000	1140	1460			ND-1500
Zinc	10000	30000	13100	3560	83500	3560-83500
Cyanide			0.8	1.4	1.2	ND-1.4

Table 3 Old American Zinc - Residential Soils

Compound	X102	X103	X104	X105	X106	X107	X108	X109	X110	X111	X112	X113	X114	X115	X116	X117	X101 Bkgnd
INORGANICS (mg/kg)																	
Aluminum	77120	6800	6270	9790	9760	7990	8030	10000	9550	7870	6540	6800	10800	8600	6910	1230	8010
Arsenic	10.2	11.5	23.2	14.5	14.1	38.4	9.1	15.9	16.7	11.9	14.1	9.8	13.7	15	14.6	7.9	7.6
Barium	184	146	183	208	236	237	139	220	243	205	238	188	380	193	174	107	106
Cadmium	21.3	42.4	120	11.0	49.9	205	53.1	35.7	33.4	15.4	37.8	50.2	33.6	13.1	13	9.1	1.9
Calcium	22000	28800	33100	23500	48200	7470	27400	10800	8570	6270	7200	37500	11700	19300	18800	44900	2530
Chromium	17.2	18.5	22.2	22.4	20.8	19.7	13.1	17.9	18.3	13.0	15.1	13.5	22.4	15.2	13.0	15.5	11.2
Copper	54.2	108	291	70.8	109	305	67.3	65.2	58.8	50.3	73.6	50	79.7	48.4	46.8	24.9	14.3
Iron	2022	19600	17600	18500	15200	19100	15700	18800	18100	14900	14900	5200	30700	18600	17000	15700	10400
Lead	1260	439	529	482	670	1230	207	235	169	199	244	188	499	537	614	67.1	39.5
Magnesium	6350	12100	11100	5070	9670	2890	14100	4290	3200	2820	3240	13100	3460	8360	6050	16600	12.0
Manganese	471	463	621	658	511	539	517	671	972	490	658	679	771	507	551	386	593
Mercury	0.3	1.1	0.2		0.2	0.5	0.2	0.2	0.2		0.2	0.2			0.2		0.2
Nickel	15.6	18.6	27.7	18.1	19.9	19.0	19	18.4	25.5	16	17	17.4	26.7	23.7	21.3	15.3	11.4
Potassium	2100	1880	1920	1750	2270	1610	2130	3110	2270	2200	3080	2450	3210	1750	1560	1610	1220
Selenium	1.7	2.3	1.6	1.7		2.1		1.5	2.3		1.5	1.8	2.3	1.6			1.3
Silver						0.6											1.9U
Vanadium	26.1	23.7	24.1	31.8	29.6	23	19.6	26.1	26	19.5	23	23.2	28.5	24.3	21.4	26.1	16.7
Zinc	1490	3910	4800	1650	3310	10800	1990	1490	1250	723	1640	1920	1690	982	1020	439	126
Cyanide													0.8				0.2U

Table 4 - Sediment Samples from Rose Creek									
Compound	X201	X202	X203	X204	X205	X206	X207	X208	X209 - Bkgnd
VOLATILES (µg/kg)									
None Detected									
SEMIVOLATILES (µg/kg)									
Fluoranthene			750					190J	
Pyrene			370J						190J
Benzo(a)anthracene			300J					2605	
Chrysene (PAH)			320J					820	
bis(2-Ethylhexyl)phthalate			300J					210	
Benzo(b)fluoranthene			540						
Benzo(a)pyrene (PAH)			220J						
PESTICIDES/PCBs (µg/kg)									
alpha-BHC	2.9JP								
Heptachlor	8.3P	1.1JP						7.7	
Aldrin	5.0P		1.2JP						
Heptachlor epoxide			2.7P	0.8JP	0.7JP	72JP	1.7JP		0.3JP
Endosulfan I		1.1J	7.1	2.1J	1.5JP	3.5P	8.9P	1.3JP	1.6J
Dieldrin	120D	1.45P	42	6.7	11	9.7	60D		3.1J
4,4'-DDE	3.2JP	0.5JP	2.4JP		1.3JP	3.6J	10	7.9P	1.3JP
Endrin			2.7JP	0.6JP	1.0JP	2.6JP	2JP		1.0JP
Endosulfan II	4.0JP		3.1JP	5.8P	2.8J	2.8J	2.5JP		
4,4'-DDD	15P		3.2JP		1.2JP		4	3.4J	0.7JP
Endosulfan sulfate			3.6JP						
4,4'-DDT	27				2.4JP			3.4JP	
Methoxychlor				2.2JP					
Endrin ketone	4JP								
alpha-Chlordane	7.9P		3.3P		1.4JP	3.1P	7.2P	97JP	0.7JP
gamma-Chlordane	22		2.7P	1.1JP	2.4J	3.1P	13P	66JP	0.5JP

Table 4 - Sediment Samples from Rose Creek									
Compound	X201	X202	X203	X204	X205	X206	X207	X208	X209 Bkgnd
Aroclor-1254					43J				
Aroclor-1260	130		170			79P	65P		
INORGANICS (mg/kg)									
Aluminum	52700	9020	13800	17400	16700	17000	17100	26500	16400
Antimony		260							0.8B
Arsenic	44.4	38.9	20.5	22.3	20.4	21.6	87.5	30.4	13.5
Barium	381	490	260	320	304	339	449	257	289
Beryllium		62700							1.2B
Cadmium	4.0	138	121	82.4	109	252	102	22.9	8.7
Calcium	8370	4370	62700	10400	17900	36200	5600	5710	15100
Chromium	94.1	23	49.7	22.3	23.3	52	59.8	55.5	23.9
Cobalt		162							15.7B
Copper	211	1800	208	47.25	51.5	217	418	212	44.8
Iron	13100	81100	23100	21900	23300	23300	26300	37400	27000
Lead	1300	3590	580	123	152	642	3170	309	76.7
Magnesium			8030	4450	5210	6300	2230	2520	5400
Manganese	105	1410	748	267	638	456	108	248	905
Mercury	10.0	4.8	2.6	0.6	0.5	2.8	23.4	3.2	0.1
Nickel		29	26.5	18	23.2	29.7		31.2	0.1B
Potassium	9260		3140	3150	3230	3070	2150		2710
Selenium	2.7	7.3	2.8		1.8	3.4	7.4	3.6	1.7B
Silver		6.1					34.9		1.3U
Sodium									221B
Thallium									1.1U
Vanadium	91.3		74.3	39.3	33.8	36.3	35.6	33.1	41.9
Zinc	479	25700	8840	2380	3140	9980	5130	2440	955
Cyanide		1.0							0.2U

Table 5 - Old American Zinc - On-site Samples								
Compound	X501 - WASTE	X502 - WASTE	X503 - WASTE	X504 - WASTE	X505 - WASTE	Range	Comparison Values	
							Soil (ppm)	Source *
SEMIVOLATILES (mg/kg)								
Benzo(a)anthracene (PAH)				39	0.42	ND-39	NONE	NONE
Chrysene (PAH)				28	0.55	ND-2.8	NONE	NONE
Benzo(b)fluoranthene (PAH)				37	0.45	ND-37	NONE	NONE
Benzo(a)pyrene (PAH)				15J	0.15J	ND-15	0.1	CREG
Indeno(1,2,3-cd)pyrene				7J		ND-7J	NONE	NONE
Benzo(g,h,i)perylene				11J		ND-11J	NONE	NONE
PESTICIDES/PCBs (mg/kg)								
Aroclor-1260					0.3P	ND-0.3P	NL	NL
INORGANICS (mg/kg)								
Antimony		15.3	20.1	30.9	168	ND-168	20	RMEG
Arsenic	55.3	117	99.1	57.9	1040	55.3-1040	5/20	CEMEG
Cadmium	18.4	112	64	26.8	659	18.4-659	40	C EMEG
Calcium		4670	10100		4310	ND-10100	NL	NL
Cobalt		22.4	19.5		26.6	ND-26.6	NONE	NONE
Copper	5040	4500	3230	485	4460	485-5040	NONE	NONE
Lead	2820	1720	1500	1250	16400	1500-16400	NONE	NONE
Mercury	0.4	10.1	5.5	0.2	1040	0.2-1040	NONE	NONE
Sodium	15000	1140	1460			ND-1500	NL	NL
Zinc	10000	30000	13100	3560	83500	3560-83500	20000	IEMEG

* MRLs and EMEGS and EPA's RfCs may not protect hypersensitive (allergic) individuals
Soil values are for child/adult.
NL = not listed

Table 6 Old American Zinc Residential Soils																				
Compound	X102	X103	X104	X105	X106	X107	X108	X109	X110	X111	X112	X113	X114	X115	X116	X117	X101 Bkgnd	Range	Comparison Values	
																			Soil (ppm)	Source *
INORGANICS (mg/kg)																				
Arsenic	10.2	11.5	23.2	14.6	14.1	36.4	9.1	15.9	16.7	11.9	14.1	9.6	13.7	15	14.8	7.9	7.6	7.5-23.2	5/20	CREG/ C EMEG
Cadmium	21.3	42.4	120	11.0	49.9	206	53.1	36.7	33.4	15.4	37.8	50.2	33.6	13.1	13	9.1	1.9	1.8-205	40	C EMEG
Lead	1280	438	529	482	870	1230	207	235	189	199	244	186	499	537	814	87.1	39.5	39.5-1280	NONE	NONE

* MRLs and EMEGS and EPA's RfCs may not protect hypersensitive (allergic) individuals
ppm = mg/kg

Table 7 - Sediment Samples from Rose Creek and Adjacent Wetlands												
Compound	X201	X202	X203	X204	X205	X206	X207	X208	X209 - Bkgnd	Range	Comparison	Values
											Soil (ppm)	Source *
SEMIVOLATILES (mg/kg)												
Benzo(a)anthracene (PAH)			0.3J					0 26J		ND-0.3J	NONE	NONE
Chrysene (PAH)			0.32J					0 82		ND-0.82	NONE	NONE
bis(Ethylhexyl)phthalate			0.3J					0 21		ND-0.3J	NL	NL
Benzo(b)fluoranthene (PAH)			0.64							ND-0.54	NONE	NONE
Benzo(a)pyrene (PAH)			0.22J							ND-0.22J	0.1	CREG
PESTICIDES/PCBs (mg/kg)												
Aroclor-1260	0.13		0.17			0 079P	0 065P			ND-0.17	NL	NL
INORGANICS (mg/kg)												
Antimony		260							0.68	ND-260	20	RMEG
Arsenic	44.4	38.9	20.5	22.3	20 4	21.6	87.5	30.4	13.5	13.5-87.5	0 5/20	CREG
Beryllium		82700							1.28	ND-82700	0.2 300	CREG/RMEG
Cadmium	4.0	136	121	82.4	109	262	102	22.8	8 7	4.0-252	40	C EMEG
Calcium	8370	4370	82700	10400	17900	38200	5800	5710	15100	4370-82700	NL	NL
Cobalt		182							15.78	ND-182	NONE	NONE
Copper	211	1800	208	47.25	51.5	217	418	212	44.8	44.8-1800	NONE	NONE
Iron	13100	81100	23100	21800	23300	23300	28300	37400	27000	13100-81000	NL	NL
Lead	1300	3590	580	123	152	842	3170	309	78.7	78.7-3590	NONE	NONE
Magnesium			8030	4460	5210	8300	2230	2620	5400	ND-8300	NL	NL
Mercury	10.0	4.8	2.8	0.6	0.5	2.8	23.4	3.2	0.1	.1-10	NONE	NONE
Zinc	479	25700	8840	2380	3140	9980	5130	2440	966	479 25700	20000	IEMEG

* MRLs and EMEGS and EPA's RfCs may not protect hypersensitive (allergic) individuals
Soil values are for child/adult.
ppm = mg/kg

ATTACHMENT 1

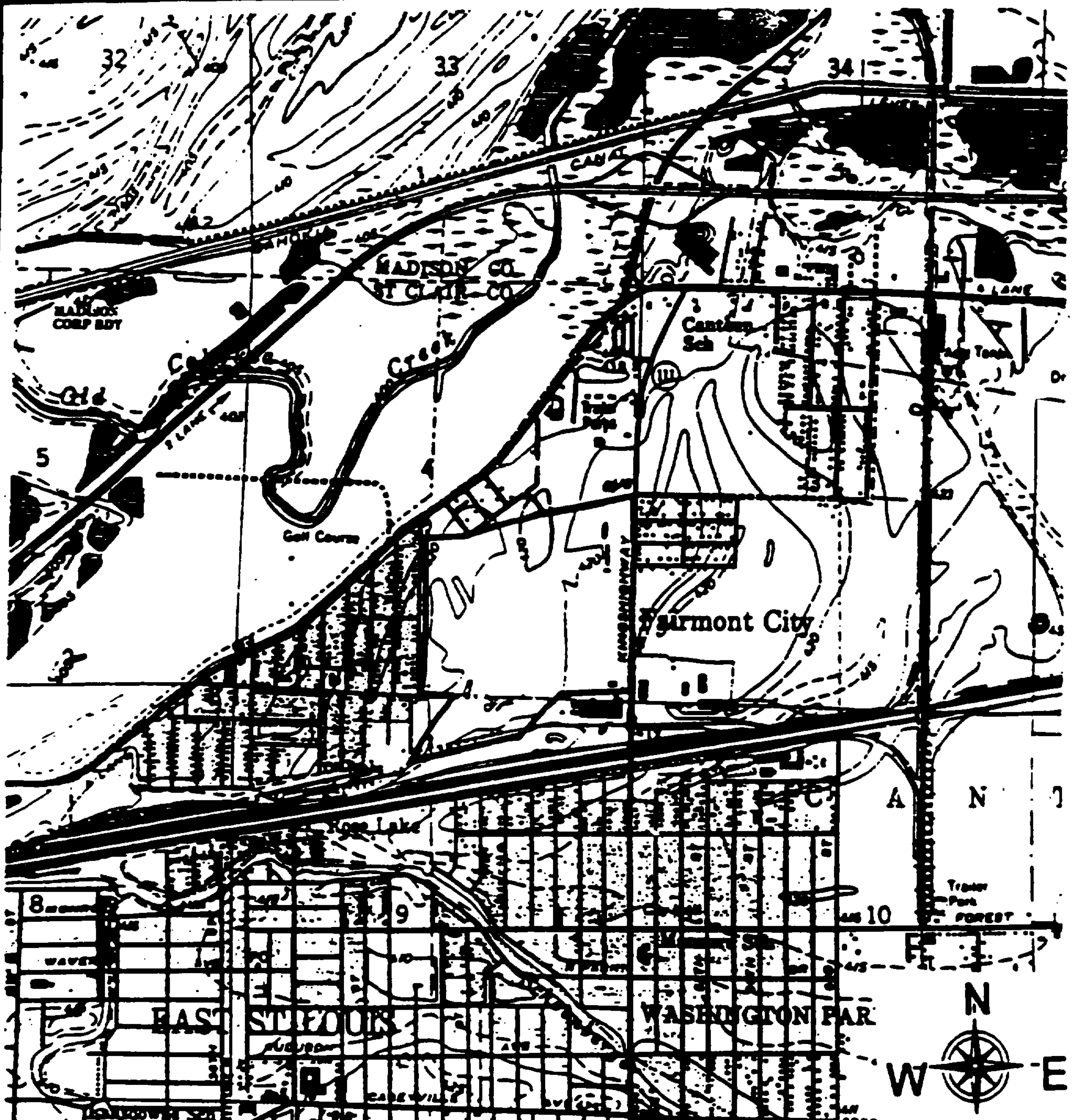

Figure 1 - The Old American Zinc Site Location Map

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355
REGIONAL AREA MAP	
Scale: 1:24,000	
LEGEND: ☐ Site Location	

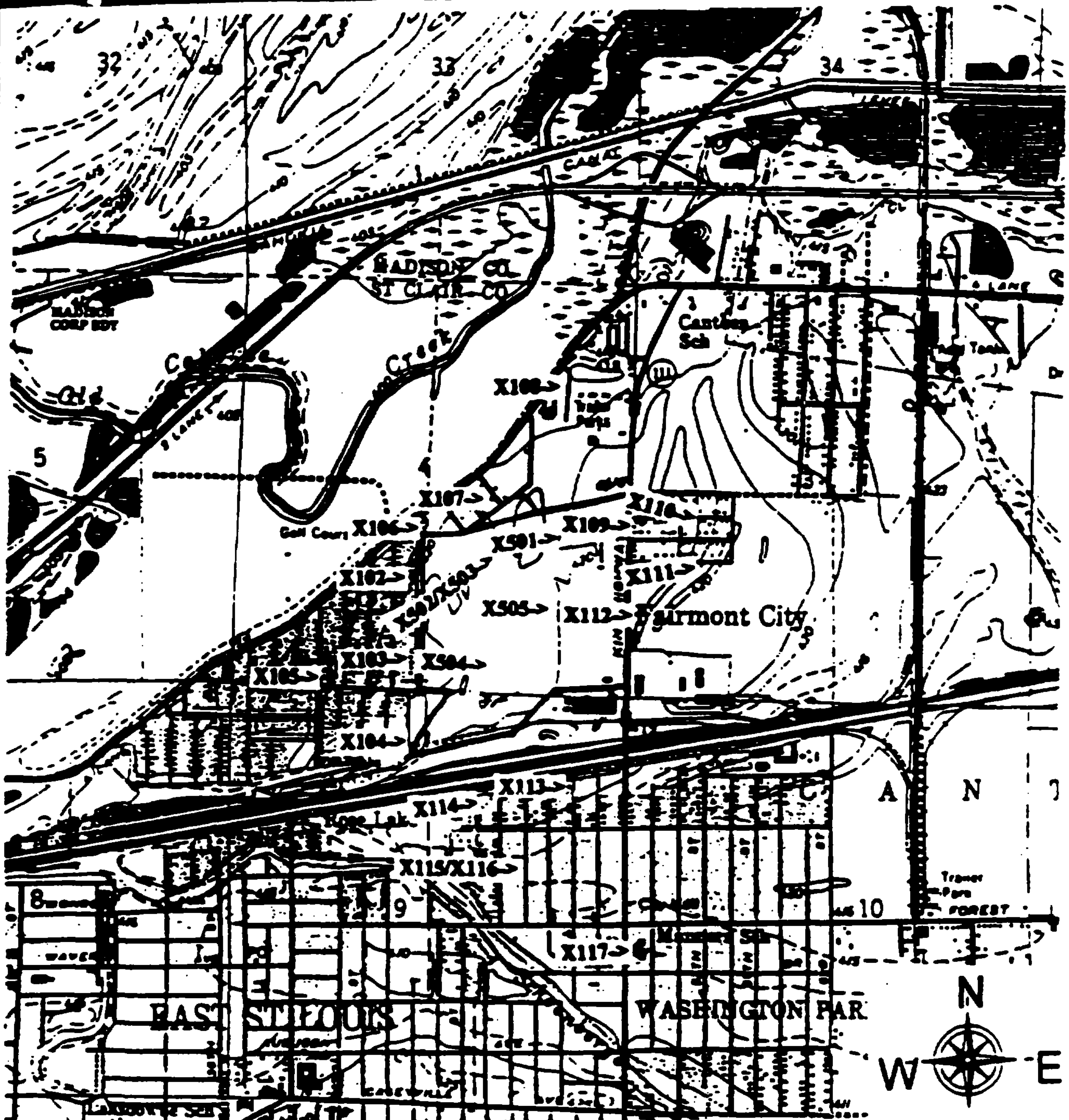

Figure 2 - Onsite and Residential Samples Location Map

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355
SAMPLE LOCATION MAP	
Scale: 1:24,000	
LEGEND: ☐ Site Location	

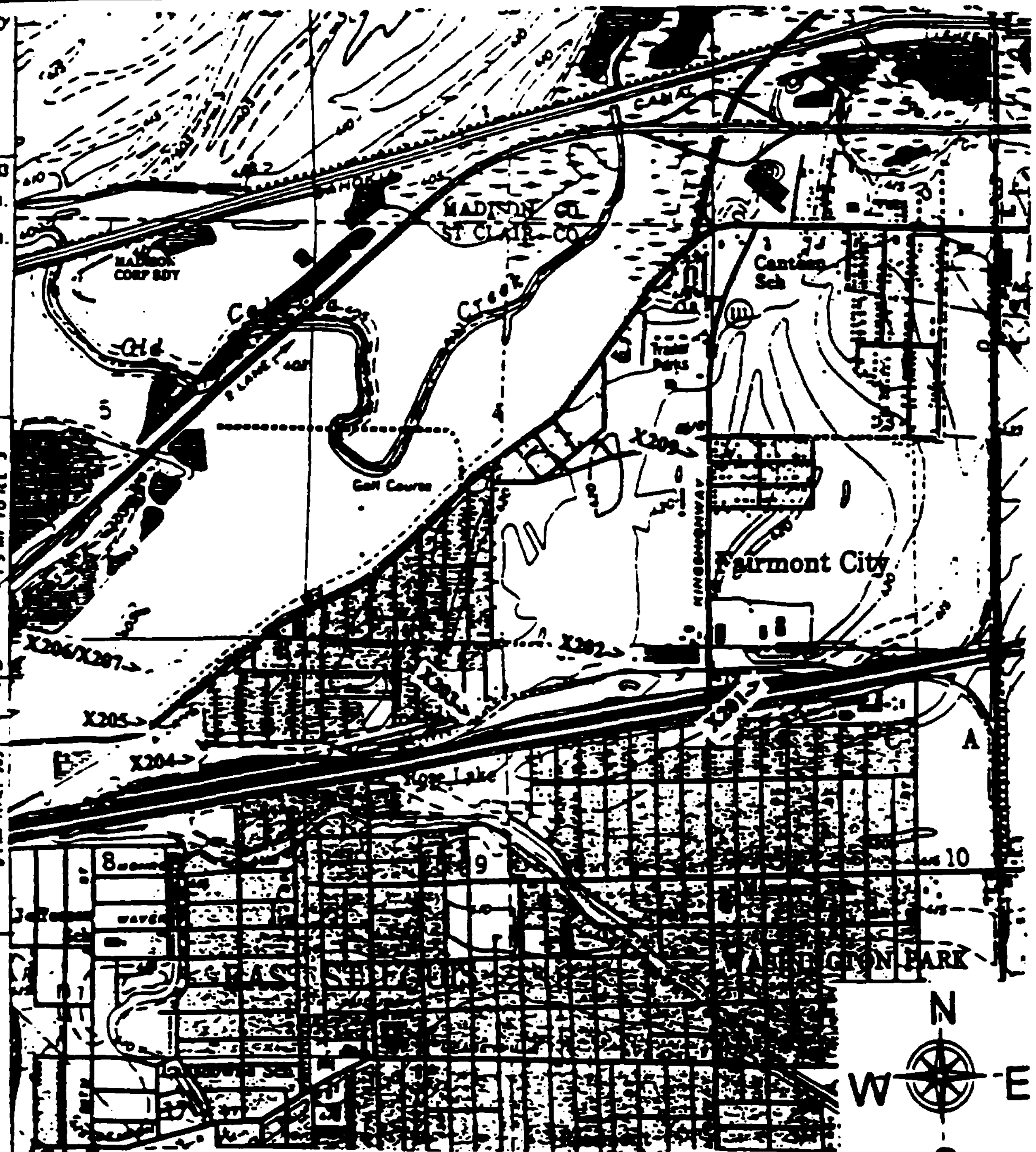

Figure 3 - Sediment Sample Location Map

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: Old American Zinc SITE ILD 000 034 355
SEDIMENT SAMPLE LOCATION MAP	
Scale: 1:24,000	
LEGEND: ☐ Site Location	

CERTIFICATION

The Old American Zinc Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Health Consultation was initiated.

William Greim

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Health Consultation and concurs with its findings.

Sharon D. Williams-Fleetwood

Chief, SSAB, DHAC, ATSDR